PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 18229/cl	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416).
International Application No. PCT/AU2003/001054	International Filing Date *(day/month/year)* 19 August 2003	Priority Date *(day/month/year)* 20 August 2002

International Patent Classification (IPC) or national classification and IPC

Int. Cl.[7] B60B 33/08, A63B 22/06

Applicant

SELLARS, Robert

This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

This REPORT consists of a total of 4 sheets, including this cover sheet.

[X] This report is also accompanied by ANNEXES, i.e., sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 4 sheet(s).

This report contains indications relating to the following items:

- I [X] Basis of the report
- II [ ] Priority
- III [ ] Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV [ ] Lack of unity of invention
- V [X] Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI [ ] Certain documents cited
- VII [ ] Certain defects in the international application
- VIII [X] Certain observations on the international application

Date of submission of the demand 19 March 2004	Date of completion of the report 13 December 2004
Name and mailing address of the IPEA/AU AUSTRALIAN PATENT OFFICE PO BOX 200, WODEN ACT 2606, AUSTRALIA E-mail address: pct@ipaustralia.gov.au Facsimile No. (02) 6285 3929	Authorized Officer I.A. KILBEY Telephone No. (02) 6283 2115

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/001054

Basis of the report

With regard to the elements of the international application:*

☐ the international application as originally filed.

☒ the description, pages **2-10,** as originally filed,
pages , filed with the demand,
pages **1,** received on **17 September 2004** with the letter of **16 September 2004**

☒ the claims, pages , as originally filed,
pages , as amended (together with any statement) under Article 19,
pages , filed with the demand,
pages **11-13,** received on **17 September 2004** with the letter of **16 September 2004**

☒ the drawings, pages **1/5-5/5** , as originally filed,
pages , filed with the demand,
pages , received on with the letter of

☐ the sequence listing part of the description:
pages , as originally filed
pages , filed with the demand
pages , received on with the letter of

With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.
These elements were available or furnished to this Authority in the following language which is:

☐ the language of a translation furnished for the purposes of international search (under Rule 23.1(b)).

☐ the language of publication of the international application (under Rule 48.3(b)).

☐ the language of the translation furnished for the purposes of international preliminary examination (under Rules 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

☐ contained in the international application in written form.

☐ filed together with the international application in computer readable form.

☐ furnished subsequently to this Authority in written form.

☐ furnished subsequently to this Authority in computer readable form.

☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.

☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished

4. ☐ The amendments have resulted in the cancellation of:

☐ the description, pages

☐ the claims, Nos.

☐ the drawings, sheets/fig.

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).**

* *Replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report since they do not contain amendments (Rules 70.16 and 70.17).*

** *Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report*

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.
PCT/AU2003/001054

Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

Statement

Novelty (N)	Claims 1-25	YES
	Claims	NO
Inventive step (IS)	Claims 6, 17, 19-21, 24-25	YES
	Claims 1 -5, 7-16, 18, 22-23	NO
Industrial applicability (IA)	Claims 1-25	YES
	Claims	NO

Citations and explanations (Rule 70.7)

(a) US 2687546

(b) US 4402108

(c) US 600172

(d) AU 5084/46 (128070)

INVENTIVE STEP: CLAIMS 1-5, 7-16, 18, 22-23

Each of citations (b)-(d) discloses devices for providing multi-directional movement comprising a housing locating a main roller able to move in any direction (claim 22) and bearing means comprising a plurality of openings (in the case of citation (b) there are three circular openings, see Fig 6) from which support rollers protrude (claims 3-5) for contacting an upper surface of the main roller. Although the devices of citations (b)-(d) are of substantially integral construction it is considered that it would not require the taking of an inventive step to make multiple (claim 18) devices in multiple parts so that the openings are incorporated into single or multiple (claim 23) bearing means of "annular" shape located above the main roller (claim 2), taking a broad construction of the term "annular". Documents (a)-(c) clearly disclose braking means urged into contact with the main roller (and having the features defined in claims 13-16) and it would not require a person skilled in the art in the taking of an inventive step to incorporate such brakes in the device of citation (d) also (claim 1).

In each of citations (b)-(d) the bearings themselves, along with certain plates, clips, etc, act to centre the roller with respect to its housing (claim 7). In the case of citations (b) and (d) (for citation (b) the embodiment depicted in Fig 6 comprises a peripheral race and two races of smaller sizes, each having roller bearings) peripherally arranged roller bearings act to centre the main spherical ball (claims 8-12).

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

Claim 17 is not considered to be fully supported by the description in that the housings described cannot be accurately considered as "tubular".

Claim 19 cannot be given a clear meaning in the absence of some definition of the meaning of the phrase "a central power transfer means".

Claim 21 is not clear in that there is no antecedent in claim 20 for "the central power transfer means".

In the absence of an orientation of the device, the references to "left and right" in claims 24-25 can be given no clear meaning.

A DEVICE FOR PROVIDING MULTI-DIRECTIONAL MOVEMENT

FIELD OF THE INVENTION

The present invention relates to mechanical devices which are movable such as wheels.

BACKGROUND OF THE INVENTION

The problem with many wheels is that they lack multi-directional movement. For example a castor wheel of a shopping trolley, although technically able to move in many different directions is frequently difficult to move in the direction the person pushing the trolley, wishes to move.

Much of the problem with the above castor wheel is associated with pushing of the trolley rather than pulling of the trolley. Because the castor wheel is actually only able to rotate in one plane, its multi-directional movement depends upon rotation of the shaft to which it is connected.

In a similar fashion articulated joints frequently are limited to movement in one plane in a similar fashion to a typical hinge.

SUMMARY OF THE INVENTION

A device for providing multi-directional movement comprising a housing having at least one main roller located therein, at least one bearing means comprising an annular member with a plurality of openings in which support rollers are located for contacting an upper surface of the or each main roller, whereby the or each main roller is able to rotate relative to the housing and a braking means for providing resistance to rotation of at least one main roller.

It is preferred that the bearing means comprises a plurality of balls or rollers.

It is to be understood that the word "couple" is intended to include transferring of load from the housing to the roller.

It is preferred that the device includes a single roller.

CLAIMS

1. A device for providing multi-directional movement comprising a housing having at least one main roller located therein, at least one bearing means comprising an annular member with a plurality of openings in which support rollers are located for contacting an upper surface of the or each main roller, whereby the or each main roller is able to rotate relative to the housing and a braking means for providing resistance to rotation of at least one main roller.

2. The device as claimed in claim 1 wherein the annular member is located above the or each main roller.

3. The device as claimed in claim 1 or 2 wherein a plurality of the support rollers are seated in the openings so that part of their surfaces protrude below the annular member.

4. The device as claimed in claim 3 wherein all the support rollers are seated so that part of their surfaces protrude below the annular member.

5. The device as claimed in any one of claims 1 to 4 wherein part of a plurality of support rollers protrude through the holes above the annular member.

6. The device as claimed in claim 1 wherein the openings each comprise a hole through the annular member which has a diameter which reduces in size to a minimum, which is less than the width of the roller bearing located therein.

7. The device as claimed in any one of claims 1 to 6 including a centering means for location around part of the or each main roller for preventing contact between the main roller and the inner wall of the housing.

8. The device as claimed in claim 7 wherein the centering means comprises a peripheral race with a plurality of roller bearings configured to contact a peripheral portion of the or each main roller.

9. The device as claimed in claim 8 including

a retaining means for retaining the centering means in position around the peripheral portion of the or each main roller.

10. The device as claimed in claim 9 wherein the retaining means comprises a circlip.

11. The device as claimed in claim 1 wherein the centering means is housed in a recessed circular region of the housing located approximately at the equitorial region or the one main roller.

12. The device as claimed in claim 11, wherein the main roller is a spherical ball.

13 The device a claimed in claim 1 wherein the braking means comprises a braking member which is configured to be urged into contact with at least one main roller.

14. The device as claimed in claim 5 wherein the braking member comprises a brake pad located above the bearing means and configured to contact a top surface of at least one main roller.

15. The device as claimed in claim 14 wherein the braking means is able to be forced by an urging means through the annular member into contact with the main roller.

16. The device as claimed in claim 15 wherein the urging means comprises a screwable member which is controlled by a horizontal screw through a side wall of the housing.

17. The device as claimed in claim 1 wherein the housing comprises a tubular portion with a plurality of stepped regions on its inner surface, including an upper stepped region for receipt of the annular member and a lower stepped region for receipt of the centering means.

18. The device as claimed in claim 1 comprising a plurality of main rollers each having one associated bearing means.

19. The device as claimed in claim 1 including a central power transfer means with roller equispaced

therearound.

20. The device as claimed in claim 1 including a peripheral race with bearings which are configured to contact outer surfaces of a plurality of main rollers.

21. The device as claimed in claim 20 wherein the central power transfer means comprises a drive shaft.

22. The device as claimed in claim 1 wherein the main roller is able to move in any direction.

23. The device as claimed in claim 1 including a plurality of bearing means.

24. The device as claimed in claim 23 including left and right side bearing means.

25. The device as claimed in claim 24 including left and right side centering means located on opposite sides of at least one roller.